Discovering the Complexity of Spatial Data: Evolution and Organization of the UCSB Maya Forest GIS

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Mesoamerica and the Maya
Four Decades in the Maya Forest

- Research in Belize and Guatemala 1975 to the present
  - Archaeological survey and excavations
  - Environmental observation and assessment
- Rediscovery of El Pilar ~ 1 resource 2 nations ~ 1983
  - Site spans the disputed border Belize & Guatemala
  - Evokes political process & community contribution
  - Engages conservation of nature and culture
  - Questions the context of heritage management
  - Builds on ecotourism
El Pilar ~ Gathering Data
Archaeology Under the Canopy

- Archaeological and Environmental Data
  - Collaborating with nations and disciplines
  - Using methods from compass and GPS
  - Integrating maps from pencils and laser
  - Analyses from keypunch to GIS

- Data Sharing
  - Results to diverse audiences
  - Data shared with colleagues
  - Data contributed to governments
  - Next steps....... The world?
Mapping in the 1980s and 90s

- Paper maps ~ varied scales for geography & archaeology
- Field observations coded and digitized
- Computerized data of archaeological sites & collections
Opening the Digital Chapter

- Initiation of the Maya Forest GIS 1998-2002
  - Digital data collection for the GIS with Keith Clarke
    - Based on *regional* data of Paseo Pantera Consortium USAID
    - Acquired *local* data from Belize, Guatemala, and Mexico
    - Gathered *site specific* data related to our research
- Distributed via ADL at UCSB
  - Created at the regional level
  - Focused on geographic data
  - Including archaeological sites
  - Archived with ADL
  - Distributed to management agencies
  - Shared with colleagues in the field
Developing the Maya Forest GIS 2002 -

- Regional data at >250k from Belize, Guatemala, & Mexico
  - Sets the research scene
  - Provides the data context
- Local data at ~50k
  - General basis of research
  - Working scale of comparative data
- Site specific data at ~10k
  - Detailed field data collection
  - Working basis of field work
- Connected with non-spatial data
  - Descriptive attributes
  - Photos and videos
  - Archaeological collections
- Student interns and projects
  - Research and training
  - Theses and Dissertations
Gathering Data on the Maya forest

- Regional data at >250k from Belize, Guatemala, & Mexico ~ The Context
  - DEM at 90 and 30m
  - Geography and boundaries
  - Geology and soil data
  - Volcanoes and hydrology
  - Place names and roads
  - Protected areas
  - Air photographs
  - Satellite coverage
  - Archaeological sites
Creating Local Area Data for El Pilar

- Local data at ~50k ~ The comparative scale
  - Topography and hydrology
  - Place names, roads, boundaries
  - Archaeological maps of the BRASS/El Pilar surveys
  - Archaeological collections attributes
  - Forest garden locations and attributes
  - Weights of Evidence
  - Soil data
El Pilar ~ The Original Source

- Site specific data at ~10k ~ The working basis
  - El Pilar Archaeological Reserve boundaries ~ 1998
  - Air photographs for the reserve ~ 1998, 2012
  - LiDAR for El Pilar Archaeological Reserve ~ 2013
  - Roads and trails of the reserve ~ from 1998
  - Control points for transit maps El Pilar ~ 1998
  - Archaeological monuments & residences ~ 2013-
  - Archaeological collections ~ 1983- present
Making the UCSB Maya Forest GIS accessible

- File management in the field and Lab
  - Naming conventions and version management
    - Initially created by year and developed over years
    - Named according to use and practice of the moment
    - Now named with a specific nomenclature with creation year

- Include geospatial and non spatial data
  - Spatial datum points for locations
  - Attributes and photos that are linked to the spatial data

- Recognizing confidentiality
  - General vs specific information
  - Sensitive locational data and evidence of looting
Field Data Collection Example: File Organization
Naming Conventions

- From informal to formal conventions
- Development of Data Dictionary
- Reflect status and creation

### Details

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Current Archaeological Data Collection

- Using the GPS for our “Go-To” points..
  - Field forms to sketch and to make observations
  - Map sketches are drawn and GPS waypoints are taken around features
  - Observations of vegetation and canopy are recorded
Remote LiDAR

And on the Ground

Field Data at 1:1500 scale
The Orientation Map
LiDAR is Archaeology Under the Canopy!
Data Collection using LiDAR
Compiling the Spatial Data
Discover of Downtown El Pilar

A work in Progress